

This review is not comprehensive. Be sure to study your notes, homework assignments and old tests as well.

1. Which of the following sets of ordered pairs would not be considered a function?

(1) $\{(-4, 1), (-1, 7), (3, 8), (5, 3)\}$

(2) $\{(-2, 5), (6, 1), (-2, 10), (6, -1)\}$

(3) $\{(2, 8), (4, 10), (6, 8), (8, 10)\}$

(4) $\{(-3, 5), (3, -5), (-6, 7), (6, -7)\}$

x-values do not
repeat in a function

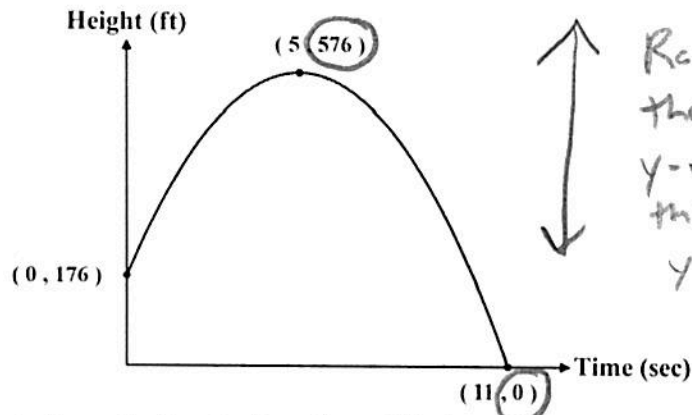
2. In the following graph, the height of an object, in feet, is given as a function of time in seconds. Which of the following would be the range of this function?

(1) $[0, 5]$

(2) $[0, 11]$

(3) $[176, 576]$

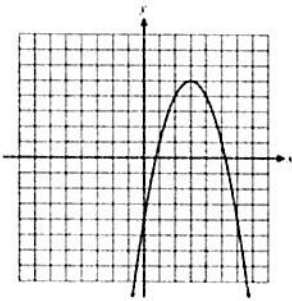
(4) $[0, 576]$



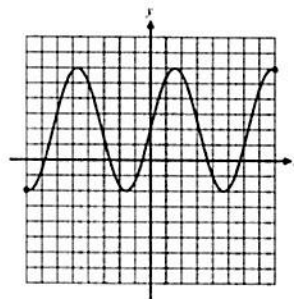
Range is
the smallest
y-value to
the largest
y-value

3. In which of the following four graphs is the output not a function of the input?

(1)

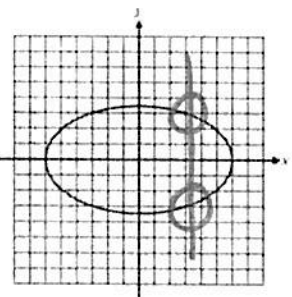


(3)



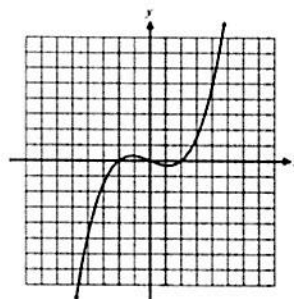
Functions
pass the
vertical
line
test

(2)



Does
Not Pass

(4)



4. If $f(x) = -\frac{1}{2}x + 6$, then which of the following values solves the equation $f(x) = 10$?

(1) 1

(3) -8

(2) -4

(4) 11

$$\begin{array}{r} 10 = -\frac{1}{2}x + 6 \\ -6 \quad -6 \\ \hline 4 = -\frac{1}{2}x \\ \frac{4}{-\frac{1}{2}} = \frac{-\frac{1}{2}x}{-\frac{1}{2}} \quad x = -8 \end{array}$$

5. The function f is defined by the formula $f(x) = x^2 + 2$ and the function g is defined by the graph shown below. Which of the following is the value of $f(g(2))$?

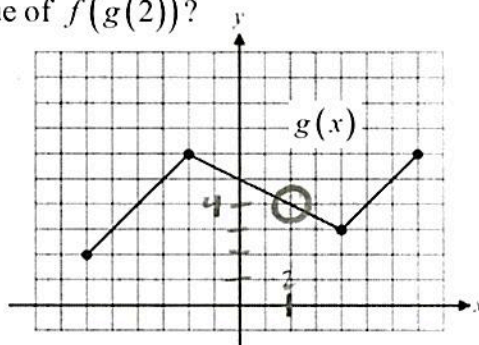
(1) 18

(3) 5

(2) 14

(4) 9

$$\begin{array}{l} g(2) = 4 \\ f(4) = (4)^2 + 2 = 18 \end{array}$$



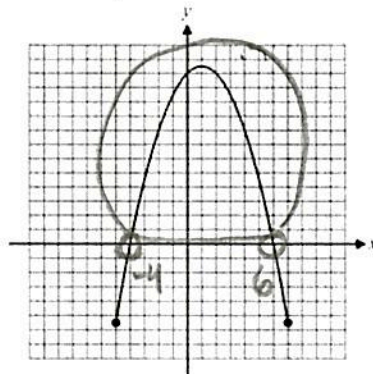
6. Given the function $f(x)$ shown in the graph below, for which of the following intervals is $f(x) > 0$?

(1) (0, 8)

(2) [0, 8]

(3) (-4, 6)

(4) [-4, 6]



Where is the function above the x-axis?

7. Which of the following values of x would *not* be in the domain of the function $f(x) = \frac{x-7}{2x+5}$?

(1) 7

(3) -5

(2) $-2\frac{1}{2}$

(4) -7

$$\begin{array}{r} 2x + 5 = 0 \\ -5 \quad -5 \\ \hline 2x = -5 \\ \frac{2x}{2} = \frac{-5}{2} \quad x = -\frac{5}{2} = -2\frac{1}{2} \end{array}$$

8. If the point $(4, -2)$ lies on the graph of $y = f(x)$, then which of the following points must lie on the graph of its inverse, i.e. $y = f^{-1}(x)$?

(1) (-2, 4)

(3) (-4, 2)

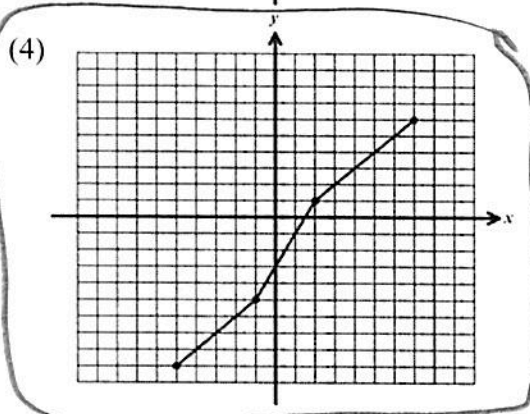
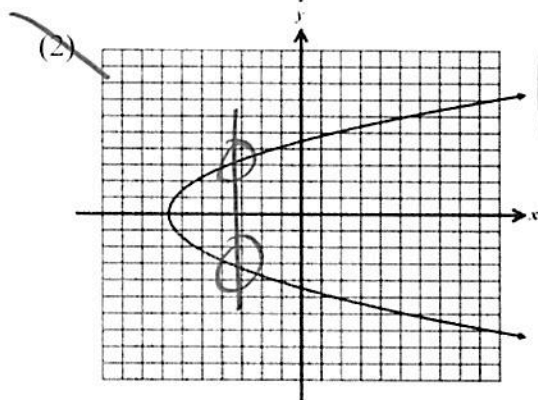
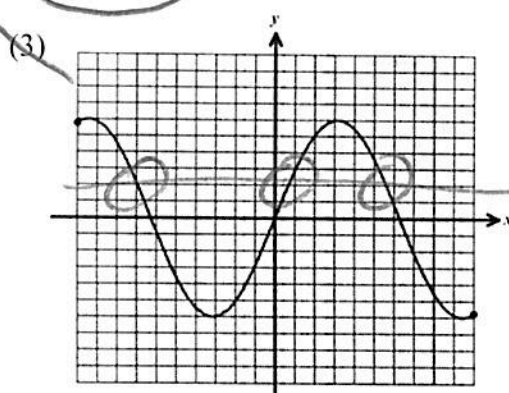
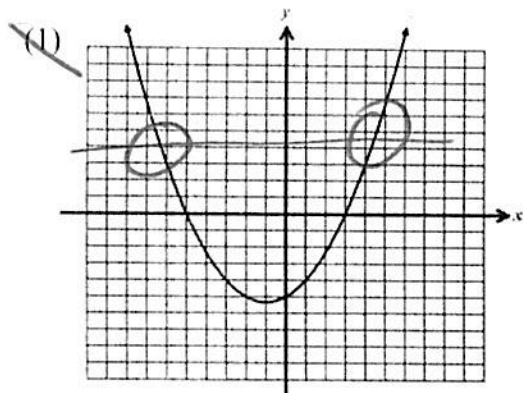
(2) $(\frac{1}{4}, -\frac{1}{2})$

(4) (4, 2)

Switch the x and y -values

9. Which of the following graphs represents a one-to-one function?

Must Pass
both Vertical
and Horizontal
line test



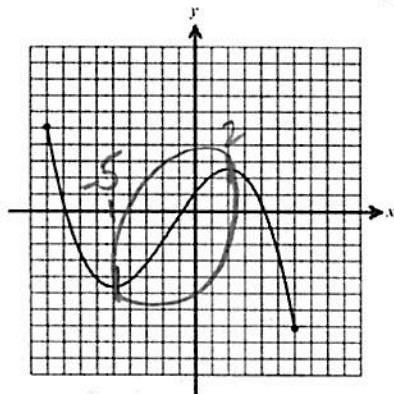
10. Given the function shown below, over which of the following intervals is the function always increasing?

(1) $0 < x < 5$

(2) $-5 < x < 2$

(3) $-1 < x < 4$

(4) $-9 < x < -5$



going up
from left
to right

11. A circle whose center is at $(5, -3)$ and which passes through the point $(7, -8)$ has a radius equal to?

(1) 5

(2) $\sqrt{29}$

(3) $\sqrt{44}$

(4) 8

Find distance
between points

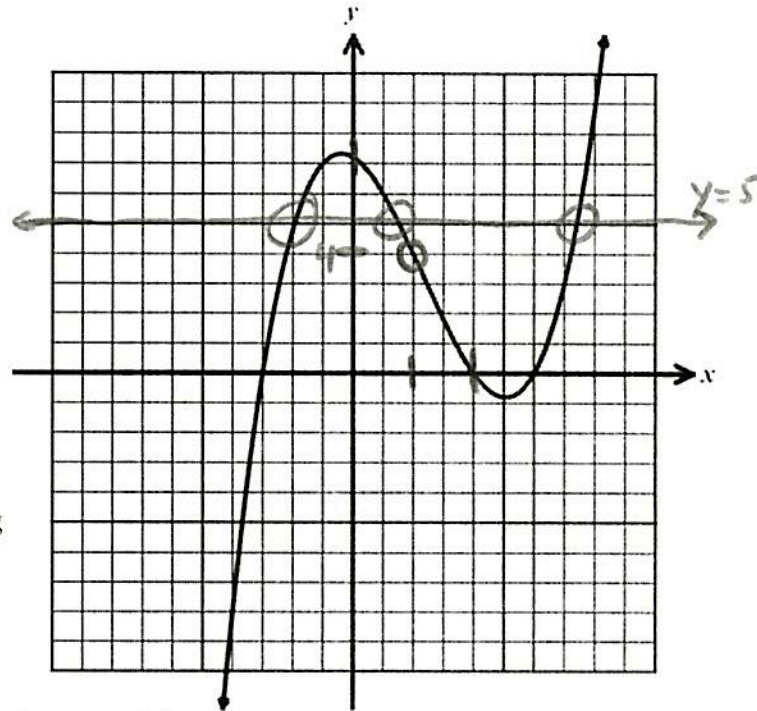
$$\begin{aligned} r &= \sqrt{(5-7)^2 + (-3-(-8))^2} \\ &= \sqrt{(-2)^2 + (5)^2} \\ &= \sqrt{4 + 25} \\ &= \sqrt{29} \end{aligned}$$

12. Given the function $y = f(x)$ shown graphed below, answer the following questions.

(a) State the value of $f(2)$. = 4
 What is "y"
 when "x" is 2?

(b) How many values solve the equation $f(x) = 5$?
 Explain how you arrived at your answer.

How many times does the function
 have a "y" value of 5? 3



(c) On the interval $0 < x < 4$ is the function increasing or decreasing? How can you tell?

decreasing because the
 graph is going down
 as you move from left to right.

(d) If a second function is defined by the formula $g(x) = \frac{2x-7}{3}$, then what is the value of $g(f(1))$? Show the work that leads to your answer.

$f(1) = 6$ From graph $g(6) = \frac{2(6)-7}{3} = \frac{12-7}{3} = \frac{5}{3}$ $g(f(1)) = \frac{5}{3}$

(e) Would the inverse of this function also be a function? Explain your yes/no answer.

The inverse $f^{-1}(x)$ would NOT be a function
 because $f(x)$ is NOT one to one (Does not pass horizontal
 line test)

13. For the function $f(x) = \sqrt{x-9}$, either $x = 0$ or $x = 45$ is a member of its domain. Determine which and explain how you arrived at your answer.

$$x - 9 \geq 0$$

$$x \geq 9$$

$x = 45$ is in the domain but $x = 0$ is NOT

14. Is the function $y = |x-6| + 2$ a one-to-one function? Explain your answer.

Graph it on the calculator

$y = |x-6| + 2$ Does not pass the horizontal line test therefore it is not one-to-one.

15. Given the function $y = f(x)$ shown below do the following.

(a) Graph the function's inverse, $f^{-1}(x)$.

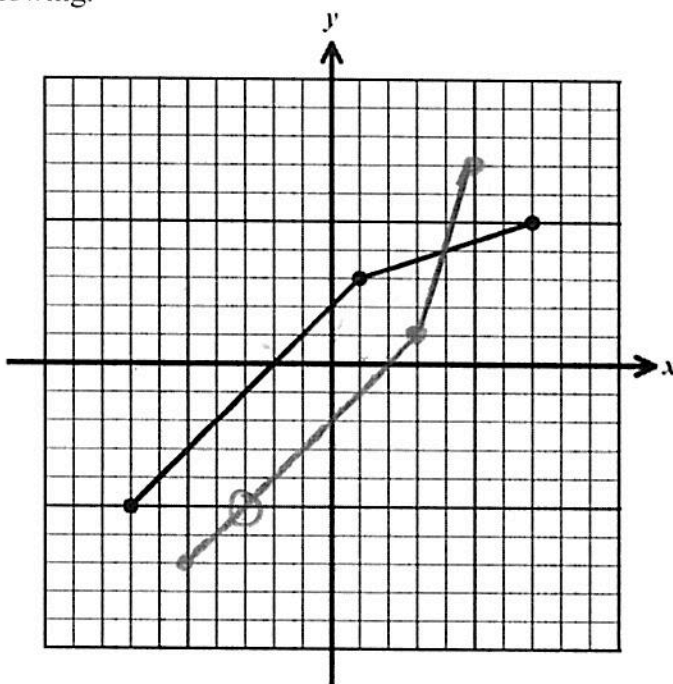
$f(x) \rightarrow f^{-1}(x)$
 $(-7, -5) \rightarrow (-5, -7)$
 $(1, 3) \rightarrow (3, 1)$
 $(7, 5) \rightarrow (5, 7)$

(b) State the range of $f^{-1}(x)$.

$[-7, 7]$

(c) What is the value of $f^{-1}(-3)$?

$f^{-1}(-3) = -5$



16. The temperature of a room is measured over the span of the day with selected values given in the table below.

Time (hrs)	0.5	1.5	2.0	4.0	5.5	7.25	8.0	9.5	10.0
Temperature ($^{\circ}\text{F}$)	64	66	71	78	81	79	71	68	66

Based on this table, explain why temperature can be considered a function of time but time cannot be considered a function of temperature. Time does not depend on temperature.

17. What are the coordinates of the center of the circle whose equation is $x^2 + 4x + y^2 - 10y + 12 = 0$?

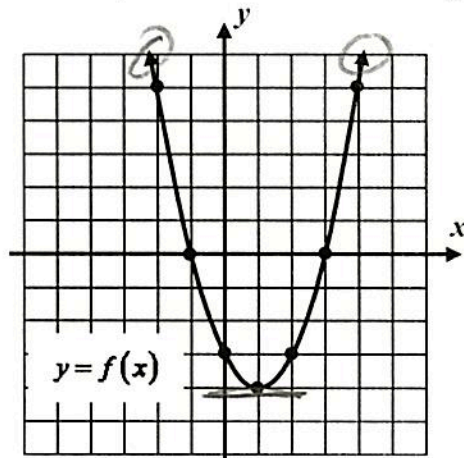
18. Determine the center and radius of the circle whose equation is $x^2 + 6x + y^2 - 14y = 42$

At the end

19. The function $f(x) = x^2 - 2x - 3$ is graphed on the grid below. Express the domain and range in interval notation.

Domain: $(-\infty, \infty)$
left \rightarrow right

Range: $[-4, \infty)$
bottom \rightarrow top



20. Which of the following values of x would not be in the domain of the function $y = \sqrt{x+4}$? Explain your answer.

$$x+4 \geq 0$$

$$x \geq -4$$

(1) $x = 0$

(3) $x = -3$

(2) $x = 5$

(4) $x = -8$

21. A function is given by the set of ordered pairs $\{(2, 5), (4, 9), (6, 13), (8, 17)\}$. Write its domain and range in roster form.

Domain: $\{2, 4, 6, 8\}$
 x

Range: $\{5, 9, 13, 17\}$
 y

22. The function $h(x) = x^2 + 5$ maps the domain given by the set $\{-2, -1, 0, 1, 2\}$. Which of the following sets represents the range of $h(x)$? Plug in the x -values

(1) $\{0, 6, 10, 12\}$

(3) $\{5, 6, 9\}$

(2) $\{5, 6, 7\}$

(4) $\{1, 4, 5, 6, 9\}$

$$h(-2) = (-2)^2 + 5 = 9$$

$$h(-1) = (-1)^2 + 5 = 6$$

$$h(0) = (0)^2 + 5 = 5$$

$$h(1) = (1)^2 + 5 = 6$$

$$h(2) = (2)^2 + 5 = 9$$

23. Which of the following values of x would not be in the domain of the function defined by $f(x) = \frac{x-2}{x+3}$?

(1) $x = -3$

(3) $x = 3$

(2) $x = 2$

(4) $x = -2$

$$x+3 \neq 0$$

$$x \neq -3$$

24. Determine any values of x that do not lie in the domain of the function $f(x) = \frac{3x+2}{2x-10}$. Justify your response.

$$\frac{2x-10 \neq 0}{+10 \quad +10}$$

$$\frac{2x}{2} \neq \frac{+10}{2}$$

$$x \neq +5$$

25. Which of the following values of x does lie in the domain of the function defined by $g(x) = \sqrt{2x-7}$?

(1) $x = 0$

(3) $x = 3$

(2) $x = 2$

(4) $x = 5$

$$\begin{array}{r} 2x - 7 \geq 0 \\ +7 \quad +7 \\ \hline 2x \geq 7 \\ \frac{2x}{2} \geq \frac{7}{2} \end{array} \quad x \geq \frac{7}{2} \text{ or } 3.5$$

26. Which of the following would represent the domain of the function $y = \sqrt{6-2x}$?

(1) $\{x : x > 3\}$

(3) $\{x : x \leq 3\}$

(2) $\{x : x < 3\}$

(4) $\{x : x \geq 3\}$

$$\begin{array}{r} 6 - 2x \geq 0 \\ +2x \quad +2x \\ \hline 6 \geq 2x \\ \frac{6}{2} \geq \frac{2x}{2} \end{array} \quad 3 \geq x$$

27. A child starts a piggy bank with \$2. Each day, the child receives 25 cents at the end of the day and puts it in the bank. If A represents the amount of money and d stands for the number of days then $A(d) = 2 + 0.25d$ gives the amount of money in the bank as a function of days (think about this formula).

(a) Evaluate $A(1)$, $A(7)$, and $A(30)$.

(b) For what value of d will $A(d) = \$10.50$.

$A(1) = 2 + .25(1)$ $A(7) = 2 + .25(7)$ $A(30) = 2 + .25(30)$

$10.50 = 2 + .25d$

$A(1) = 2.25$

$A(7) = 3.75$

$A(30) = 9.50$

$\frac{8.50}{.25} = \frac{.25d}{.25}$

$d = 34$

(c) Explain why the domain does not contain the value $d = 2.5$.

(d) Explain why the range does not include the value $A = \$3.10$.

The money is added at the end of a full day therefore whole # only.

25¢ is added every day
3.10 is not a possible output when we start at \$2 and add 25¢.

28. Write $\frac{x^3 - 10x^2 + 11x + 70}{x+2}$ in the form $q(x) + \frac{r}{x+2}$, where $q(x)$ is a polynomial and r is a constant.

29. What is the domain of $\frac{2}{\sqrt{x^2 - x - 30}}$?

30. Is $(x+4)$ a factor of $x^4 - 3x^3 + 25x^2 - 10$. Explain your answer.

31. Solve $\frac{x+1}{x-3} \geq 2$ and express your answer in set builder notation.

32. Solve $x^2 + 40 = -6x$ by completing the square.

33. Solve for all zeros: $P(x) = x^5 + 2x^3 - 24x$

$$17) \quad x^2 + 4x + y^2 - 10y + 12 = 0$$

Use Completing

$$x^2 + 4x + \boxed{4} + y^2 - 10y + \boxed{25} = -12 + \boxed{4} + \boxed{25} \text{ the Square}$$

$$\frac{4}{2} = 2 \\ 2^2 = 4$$

$$\downarrow \quad \frac{-10}{2} = -5 \quad \downarrow \\ (-5)^2 = 25$$

$$(x+2)^2 + (y-5)^2 = 17$$

$$\boxed{\text{center} = (-2, 5) \quad \text{radius} = \sqrt{17}}$$

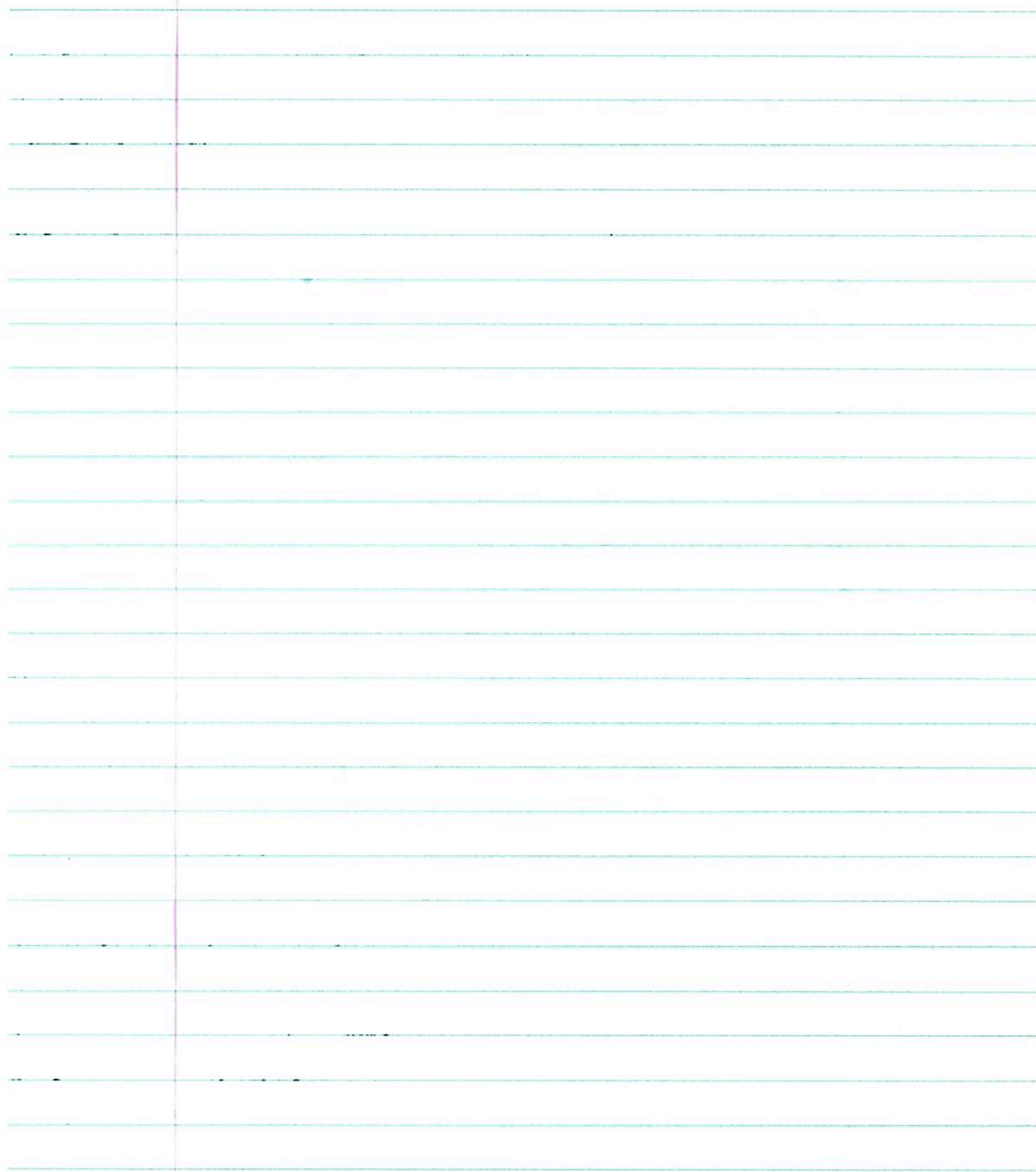
$$18) \quad x^2 + 6x + y^2 - 14y = 42$$

$$x^2 + 6x + \boxed{9} + y^2 - 14y + \boxed{49} = 42 + \boxed{9} + \boxed{49}$$

$$\frac{6}{2} = 3 \quad 3^2 = 9 \quad \frac{-14}{2} = -7 \quad (-7)^2 = 49$$

$$(x+3)^2 + (y-7)^2 = 100$$

$$\boxed{\text{center} = (-3, 7) \quad \text{radius} = \sqrt{100} = 10}$$



Alt

$$x+2=0$$

$$x=-2$$

28)

$$\begin{array}{r} \overline{x^2 - 12x + 35 + \frac{0}{x+2}} \\ x+2 \overline{) x^3 - 10x^2 + 11x + 70} \\ \underline{-(x^3 + 2x^2)} \\ -12x^2 + 11x \\ \underline{-(-12x^2 - 24x)} \\ 35x + 70 \\ \underline{-(35x + 70)} \\ 0 \end{array}$$

$$\begin{array}{r} 1 \quad -10 \quad 11 \quad 70 \\ -2 \overline{) -2 \quad 24 \quad -70} \\ 1 \quad -12 \quad 35 \quad 0 \\ \boxed{x^2 - 12x + 35 + \frac{0}{x+2}} \end{array}$$

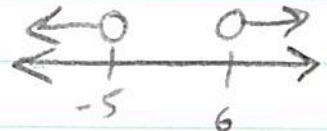
29)

$$\frac{2}{\sqrt{x^2 - x - 30}}$$

$$x^2 - x - 30 > 0 \quad \text{GOLI}$$

$$SB: \{x \mid x < -5 \text{ or } x > 6\}$$

$$\frac{(x-6)(x+5)}{x=6 \quad | \quad x=-5}$$



$$\text{Int. } (-\infty, -5) \cup (6, \infty)$$

30) Plug in -4

$$(-4)^4 - 3(-4)^3 + 25(-4)^2 - 10 = 838 \quad \boxed{\text{Not a factor}}$$

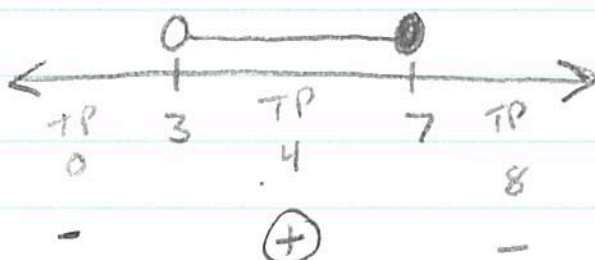
$$LCD = x-3$$

$$31) \frac{x+1}{x-3} \geq 2 \quad \frac{x+1}{x-3} - \frac{2(x-3)}{1(x-3)} \geq 0$$

$$\frac{x+1}{x-3} - \frac{2x-6}{x-3} \geq 0 \quad \frac{-x+7}{x-3} \geq 0$$

Closed $-x+7=0$
 $7=x$

open $x-3=0$
 $x=3$



$$\text{SB: } \{x \mid 3 < x \leq 7\}$$

$$32) x^2 + 40 = -6x$$

$$x^2 + 6x = -40 \longrightarrow x^2 + 6x + \boxed{9} = -40 + \boxed{9}$$

$$\frac{6}{2} = 3$$

$$3^2 = 9$$

$$(x+3)^2 = -31$$

$$x+3 = \pm\sqrt{-31}$$

$$x = -3 \pm \sqrt{-31}$$

$$x = -3 \pm i\sqrt{31}$$

$$33) P(x) = x^5 + 2x^3 - 24x$$

$$0 = x(x^4 + 2x^2 - 24)$$

$$0 = x(x^2 - 4)(x^2 + 6)$$

$$0 = x(x+2)(x-2)(x^2 + 6)$$

$$x=0 \quad x=-2 \quad x=2 \quad x^2+6=0$$

$$x^2 = -6$$

$$x = \pm i\sqrt{6}$$

$$x = 0, -2, 2, \pm i\sqrt{6}$$

